# The Anatomy of Classical and Modern Infant Industry Arguments

By

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Contents: I. Introductory Remarks. — II. The Classical Doctrine: 1. The Broad Classical Argument; 2. The Narrow Argument. — III. Modern Arguments for Infant Industry Protection: 1. The Interdependence of Investment Decisions; 2. The Dual Economy Argument; 3. Economies of Scale Argument.— IV. Evaluation of the Arguments: 1. Lack of Empirical Evaluation; 2. More Efficient Alternatives. — V. Conclusion.

## I. Introductory Remarks

Of all the arguments that are normally advanced in defense of a national protective tariff only the infant industry argument can be shown to be in the interest of a more efficient allocation of resources in the world as a whole. As such, the argument has great intellectual appeal. The modern literature on economic development has recently produced some extensions of the old classical argument, which have broadened its applicability and given it new intellectual respectability. Yet, careful analysis of the arguments in the literature shows a remarkable lack of clarity about what the argument is and about the conditions under which it is valid.

In the following paper I shall review the scientific content of the classical argument for infant industry protection as it has been advanced by A. Hamilton, F. List and C. F. Bastable. In the third part I shall contrast the classical with modern versions of the argument based on first, the concept of the interdependence of investment decisions (H. B. Chenery and A. O. Hirschman), second, the dual economy argument (E. E. Hagen) and third, a version underlying the demands of less developed countries for temporary preferential tariff reductions by the indus-

*Remark:* This paper was written while I was a member of the faculty at the University of Chicago and undertook research under the auspices of a Rockefeller Foundation supported study on trade and technical change. The director of this study is Harry G. Johnson, to whom I am indebted for many helpful comments on this paper.

trial nations (voiced at the 1964 Geneva Conference on Trade and Development)[1]. In Part IV of this paper the merit of these arguments is evaluated.

## II. The Classical Doctrine

The classical infant industry dogma consists of two main branches. The first of these treats the term "infant industry" in the broad sense so that it is synonymous with "industrialization," while the second employs the term narrowly in the sense of one specific industry.

### 1. The Broad Classical Argument

According to the broad argument for infant industry protection the problem is that, given the current market rate of return on investment, insufficient resources are invested in industry because the private rate of return there is below its social rate. This argument is represented in Figure 1, where MSR and MPR stand for marginal social and marginal private rates of return respectively.

Because of the divergence between private and social rates of return in industry the stock of capital in industry, OB, is short of what it ought to be by the quantity BB'. Tariffs should therefore be used to raise the private rate of return until it corresponds to the social rate and the socially optimal relationship between capital stock in industry and agriculture is achieved, which in equilibrium would reduce capital in agriculture from OA to OA' and increase the capital in industry from OB to OB'.

The validity of this kind of argument for tariff protection depends on the nature of the causes assumed to underly the divergence between the

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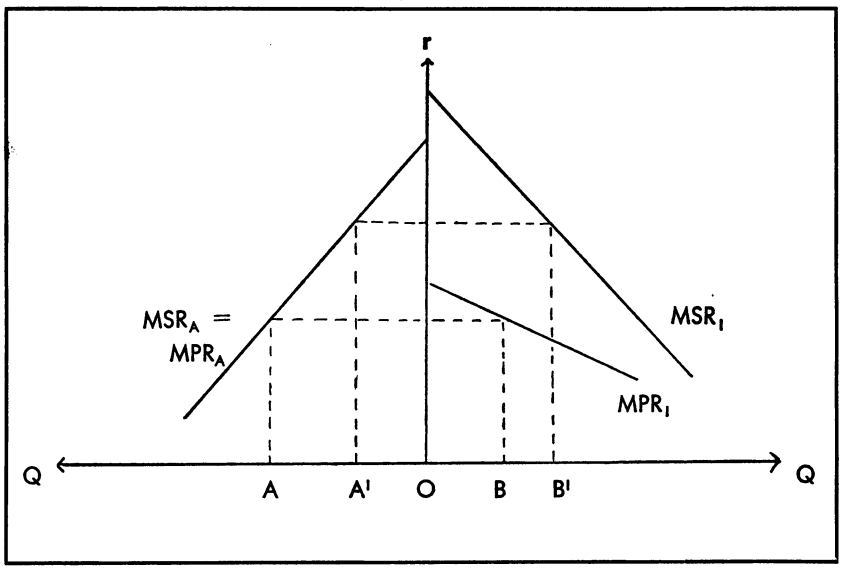
[1] References to the publications of the authors named in this paragraph are: Alexander Hamilton, "Report on Manufactures", Communicated to the House of Representatives, December 5, 1791, in: *Alexander Hamilton's Papers on Public Credit, Commerce and Finance*, Ed. by Samuel McKee, Jr., With an Introd. by J. Harvie Williams, The American Heritage Series, No. 18, New York, 1957, pp. 175sqq. — Friedrich List, *Das nationale System der politischen Ökonomie*, Stuttgart u. Tübingen, 1841. — C. F. Bastable, *The Theory of International Trade, With Some of Its Applications to Economic Policy*, 4th Ed., Rev., London, 1903. — Hollis B. Chenery, "The Interdependence of Investment Decisions", in: *The Allocation of Economic Resources*, Essays in Honor of Francis Bernard Haley, By Moses Abramovitz et al., Stanford Studies in History, Economics, and Political Science, 17, Stanford, 1959, pp. 82sqq. — Albert O. Hirschman, *The Strategy of Economic Development*, Yale Studies in Economics, 10, New Haven, 1958. — Everett E. Hagen, "An Economic Justification of Protectionism", *The Quarterly Journal of Economics*, Vol. LXXII, Cambridge, Mass., 1958, pp. 496sqq. — United Nations Conference on Trade and Development, *Towards a New Trade Policy for Development*, Report by the Secretary-General of the United Nations Conference on Trade and Development, E/Conf. 46/3, 12 February 1964, mimeographed.

Figure 1




private and social rates. If it is assumed that industrialization improves the sociological, political and cultural characteristics of a country's population then the tariff protection is justified only if these new characteristics also make the population more productive and thus ultimately allow the removal of the tariff. The desirability of the qualities of an industrial society without the cost-reducing effects on production suggests the need for the imposition of a permanent rather than a temporary tariff and therefore is not a valid infant industry argument.

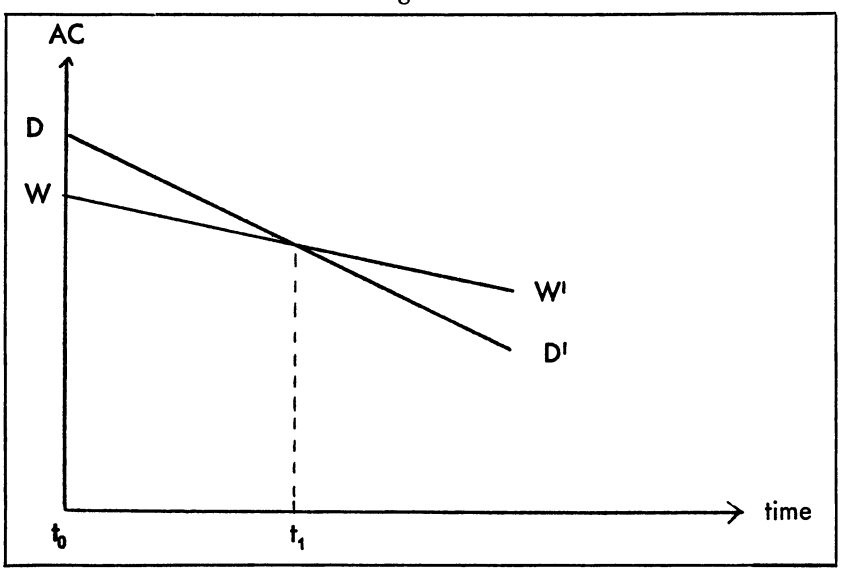
Changes in the character of the productive resources accompanying industrialization must be irreversible and non-appropriable by the private agent connected with their creation; that is, they must be truly external economies, for otherwise they should be considered as part of private return and would therefore not be responsible for the difference between private and social rates of return. Examples of such changes are the population's increased familiarity with mechanical and chemical products and its willingness to submit to the disciplines and rigors of work in factories and life in cities. Such qualities of workers are necessary if a country wishes to enable its industry to produce at minimum social cost.

## 2. The Narrow Argument

The narrow argument for infant industry protection is easily described in one sentence and a simple diagram: As a result of a process that goes

on through the passage of time, the average cost of the industry's output falls below the world price[1]. Figure 2 makes this point geometrically; it shows that at time $t_0$ the world price (WW') is below the domestic price (DD'). A unit tariff of WD is sufficient to get domestic production started, the cost of which falls below that prevailing in the rest of the world at time $t_1$. Between times $t_0$ and $t_1$ the unit tariff represented by the vertical distance between DD' and WW' becomes continuously smaller until it reaches zero at time $t_1$.

Figure 2




However, this simple description of the cost-pattern in an infant industry is ambiguous and incomplete in several respects, thus requiring the following comments and clarifications:

(1) Under the traditional, classical assumptions of perfect foresight and perfect competition, there exists a valid argument for infant-industry protection only if the cost-reductions are due to a stock of accumulating production-knowledge freely available to all:

[1] F. W. Taussig is careful to point out the necessity that domestic cost of production falls below world price, which may or may not also be falling. Decline in domestic price alone is insufficient as a proof that the industry was deserving temporary tariff protection. See Frank William Taussig, *Some Aspects of the Tariff Question*, Harvard Economic Studies, Vol. XII, Cambridge and London, 1924, p. 19. In fact, domestic price could actually be rising through time and yet the industry would be qualifying for temporary tariff protection as long as the domestic price became lower than world price.

(a) If the cost-reductions going on through time are due to internal economies, then entrepreneurs can be expected to recoup initial losses by abnormal profits in later periods. The existence of internal economies is inconsistent with the assumption of perfect competition.

(b) Therefore only external economies are consistent with perfect competition and costs falling through time. However, even most types of external economies can be expected to be internalized by the appropriate choice of the size of industries or organization of the labor market. Consider economies external to each firm but internal to the industry. These can be exploited by industry-wide ownership of production. Similarly, so-called pecuniary external economies to the industry originating in supply industries resulting from the increased scale of output there can be internalized by including the supply industries in the original industrial complex.

If cost-reductions due to such causes are excluded, there remain only those external effects associated with the learning process which occur when entrepreneurs and workers acquire new skills. This process is required whenever a basic technology is to be adopted to new conditions of climate, raw materials, special labor skills etc.[1].

This learning process is considered to be the ultimate justification for an infant industry tariff by most analysts. However, the types of learning processes qualifying was narrowed down in a recent contribution by M. C. Kemp, who argued that all of the acquired skills must be freely available to all entering firms[2], for otherwise the existing firms could be expected to internalize the returns from the acquired skills.

Kemp's argument applies primarily to the entrepreneurial abilities of the firm's owners. But laborers also acquire skills and Kemp's reasoning applies to them as well. G. Becker has shown that if workers acquire general skills useful in one industry, there is a tendency for a genuine apprenticeship program to develop as a result of which lower pay during the learning period is born by the laborer himself and has to be accepted by anyone who wishes to obtain the higher wages of the skill in later years[3]. Under the classical assumption of perfect foresight, such institu-

[1] See Th. W. Schultz, *Transforming Traditional Agriculture*, Studies in Comparative Economics, 3, New Haven and London, 1964, for an analysis of the importance of local adaptation of hybrid seeds, fertilizer usage etc., in order to reap benefits comparable to those gained from their use elsewhere. — See also Kenneth J. Arrow, "The Economic Implications of Learning by Doing", *The Review of Economic Studies*, Vol. XXIX, Edinburgh and London, 1961/62, pp. 155sqq., for an analysis of this type of phenomena.

[2] See Murray C. Kemp, "The Mill-Bastable Infant-Industry Dogma", *The Journal of Political Economy*, Vol. LXVIII, Chicago, Ill., 1960, pp. 65sqq.

[3] See Gary S. Becker, *Human Capital, A Theoretical and Empirical Analysis, With Special Reference to Education*, National Bureau of Economic Research, No. 80, General Series, New York and London, 1964.

tional developments can be expected to take place when an industry is being considered for introduction.

As a consequence of this analysis I conclude that the infant industry argument is valid only under one type of learning process, namely that where other entrepreneurs and other workers benefit by the acquisition of skills by those actually doing the work.

It is clear that this conclusion has to be modified if one is willing to assume that conditions of perfect foresight do not exist in the markets. The extension of the analysis into a world of uncertainty has been undertaken by some modern writers, whose contributions I shall discuss in Part III of this paper.

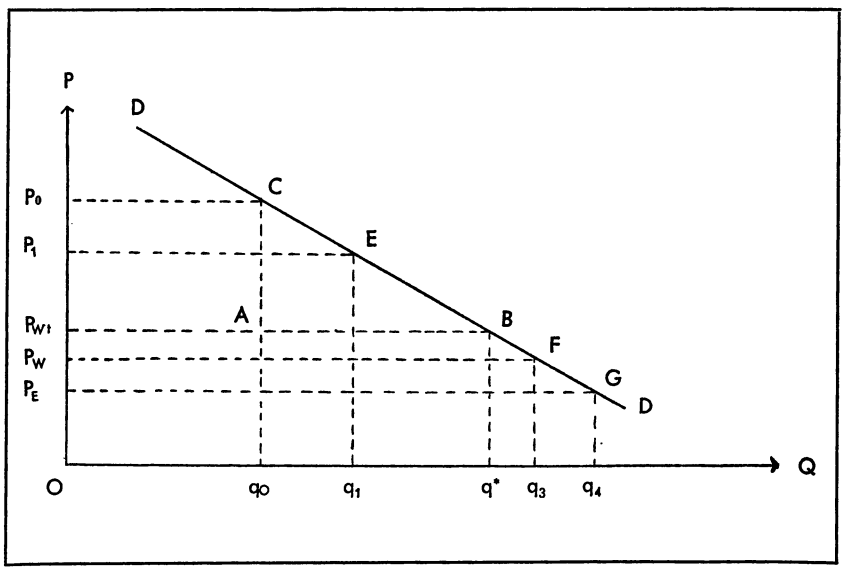
(2) Bastable argued that the mere existence of externalities is an insufficient cause for the erection of a temporary tariff barrier but that an additional condition must be fulfilled, namely that the social cost of protection in the early years must be smaller than the social benefits from lower cost of production in later years, properly discounted[1]. This point is important for any rational decision-making process based on a cost-benefit analysis of tariff protection. Yet, to my knowledge no-one has specified the exact nature of these costs and benefits or has suggested a method of measuring them. In the following I shall present an analytical framework for the measurement of these costs and benefits.

Assume that the infant industry under consideration is small so that *all* factors of production it requires are available in sufficiently large amounts at the going market price, which for convenience is assumed to be equal to the true social opportunity cost of these resources. From the previous discussion it follows that the industry must be perfectly competitive. Given these assumptions, the market wage rate, $\bar{w}$, and the interest rate $\bar{t}$, the industry's supply curve is perfectly elastic at price $P_0$ (Figure 3). With the domestic demand schedule (DD), and the world price including transportation cost ($P_{wt}$) as shown in the diagram, the country would meet all of its demand by importing $Oq^*$ from the rest of the world. When a tariff at the rate $P_0P_{wt}/P_{wt}O$ or higher is imposed on the output of this industry, imports cease, domestic price rises to $P_0$ and consumption becomes equal to domestic production $Oq_0$.

The social cost of the tariff can be shown to have two components. The reduced consumption from $q^*$ to $q_0$ involves a loss of consumer utility equal to the area $q_0q^*$ BC, of which $q_0q^*$ AB are recovered when the resources originally necessary to pay for that amount of imports are distributed over the rest of the economy. The remaining area ABC represents a deadweight loss of consumer surplus.

[1] Bastable, *op. cit.*, p. 140.

Figure 3




The second component of the cost is equal to the area $P_{wt}$ $ACP_o$ for the following reasons. The total cost of producing $Oq_o$ domestically requires $Oq_o$ $CP_o$ resources at the assumed true social opportunity cost, i.e. workers and capital in this employment earn no rent, the value of production of other products they would have produced is equal to that rectangle. However, without a tariff the same quantity of product can be obtained from foreigners in exchange for exports requiring $Oq_o$ $AP_{wt}$ resources. Thus the total social cost of having the prohibitive tariff is equal to the area $P_oP_{wt}BC$, which I will call $C_o$.

According to the earlier argument, the infant-industry characteristic implies that the supply curve of the domestic industry shifts down through time. Assume that in the next period the result of such a shift is the new price ($P_1$) and new quantity $q_1$. The cost in the second period is now equal to the rectangle $P_1P_{wt}$ BE, called $C_1$. In subsequent periods the downward shift continues, leading to a series of costs, $C_2$ ... $C_n$. It is clear that when the domestic price has fallen to $P_{wt}$, cost is zero. I consider this to occur at time period n (i.e. $C_n = 0$). Further cost reductions after period n yield positive gains, which can be seen in the diagram as being of the nature of the area $P_{wt}P_wF$ B, which is relevant when domestic cost of production has reached world price, $P_w$. Let $G_{n+1}$ ... $G_{n+m}$ stand for the series gains.

The Bastable argument can now be restated formally as

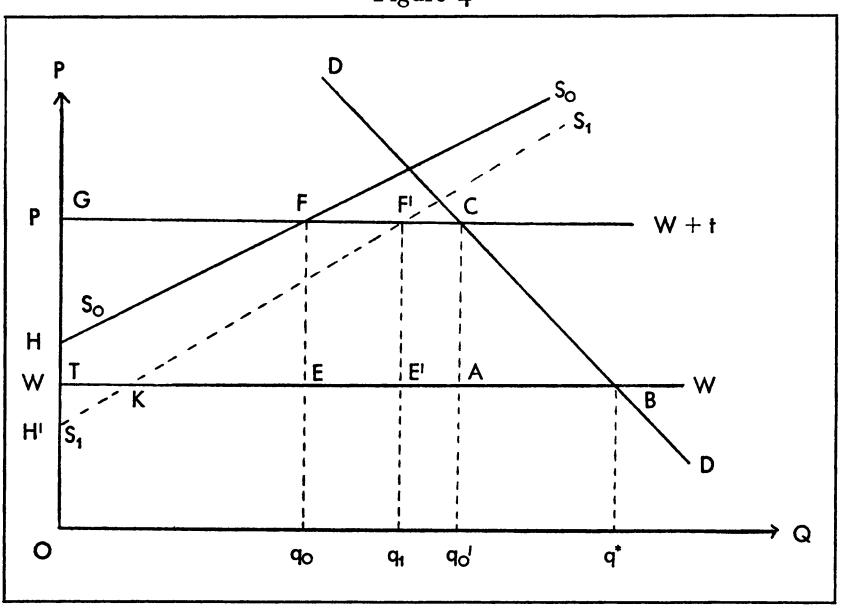
$$\frac{C_1}{(1+r)}+\frac{C_2}{(1+r)^2}+\frac{C_n}{(1+r)^n}<\frac{G_{n+1}}{(1+r)^{n+1}}+\frac{G_{n+2}}{(1+r)^{n+2}}+\cdots\frac{G_{n+m}}{(1+r)^{n+m}}$$

where r is the social rate of discount, and m is the number of years over which the gains are expected to accrue: Only when the value on the right side exceeds that on the left is the infant industry worth protecting.

In the above example an analytical difficulty arises once domestic cost becomes lower than world price ($P_w$) minus transportation cost ($P_E$). At that cost the country can supply the product to the former supplier at a lower price, including transportation cost, than the one at which the supplier can produce it himself. With truly perfectly elastic supply of inputs the country producing at $P_E$ would take over the entire world market.

In order to deal with this problem and in order to introduce the possibility of some imports in spite of tariff protection I shall now assume that the industry-supply curve is upward sloping. The analysis of this case is essentially the same as under the one just completed, except that the concepts of producer surplus and tariff revenue have to be introduced. Figure 4 can be used to show the costs and gains[1].

Figure 4




[1] This part of the analysis and the diagram are due to E. Choudri.

The distance Oq* indicates the quantity of imports before the imposition of the tariff WP. After the tariff, imports are $q_o'q_o$, domestic production $Oq_o$. There is a consumers' surplus deadweight less equal to ABC. The tariff revenue EAFC can be considered, for analytical purposes, as being rebated by the government to the purchaser of the commodities and therefore is not a loss. The area TEFG, in the previous case considered a complete loss under present assumptions contains producers' surplus, HFG, which represents not a waste of resources but only a transfer of income from consumers to producers. Thus, the cost in period one, after the initial imposition of the tariff and before a downward shift in the supply curve, is equal to the sum of the two areas ABC and HTEF.

Positive gains begin to appear when the domestic supply schedule ($S_1$ $S_1$) has shifted downward sufficiently, so that total producer surplus (H'F'G) is greater than consumer surplus loss (ABC) plus the area KE'F'. The comparison and discounting of the streams of costs and gains is the same as in the previous example.

## III. Modern Arguments for Infant Industry Protection

### 1. The Interdependence of Investment Decisions

The concept of external economies in the static context refers to cost and benefits from production not adequately reflected in market prices. In the dynamic growth context "external economies" are effects which one investment project has on the profitability of another[1]. These dynamic externalities occur if current market prices do not accurately reflect future as well as present demand and supply conditions so that investments made on the basis of these prices are not maximizing the social return to the resources.

The absence of competitive equilibrium over time and the resultant possible misallocations are described by the following example drawn from Chenery[2]. Consider two related industries, steel and metalworking, where the metalworking industry's demand for steel is met through imports. Now assume that an innovation in the steel-industry lowers its cost of production so that domestic production becomes feasible. If the current imports of steel are taken as a guideline in determining the size of the steel plant, underinvestment takes place because the ultimately lower supply price of domestic steel will increase the demand for steel

[1] See Chenery, *op. cit.*, p. 83, for a discussion of the origin of these concepts. It should be pointed out that Chenery does not himself recommend specific methods of dealing with the misallocation of resources resulting from these dynamic external economies. He only points to the need for investment planning.

[2] *Ibid.*, p. 85.

from the metalworking industry. "In this case, external economies exist ... because coordinated investment decisions would result in simultaneous investment in steel and metalworking and a lower-cost supply of metal products"[1].

The market will, under the normal competitive assumptions, tend to wipe out the difference in cost between the incoordinated and coordinated investment projects unless there are internal economies of scale in the steel industry in which case the investments take place only if they are coordinated.

This analysis can easily be used as a justification for temporary tariff protection because tariffs raise the profitability of investment above the free-market level and attract desired resources into the industry. Once the desired scale of investments has been achieved the tariff can be removed without any efficiency-distorting effects.

The argument about the interdependence of investment decisions appears to me to modify the classical analysis by taking account of the problem of market information and uncertainty. Current market prices fail to reflect future demand and supply conditions if the market-place does not have all of the relevant information. It appears to be quite reasonable to assume that the market-place at any given moment does not have all of this information. But it is not reasonable to assume that the entrepreneurs considering an investment project, say a steel-mill, will be unable to obtain the relevant information which they need to decide on the scale of their mill. Information can be purchased, there are trade journals and, especially in an underdeveloped country, investment projects are discussed and well-known to the business community.

If it is true that these sources of information are available, then the Chenery-type investment misallocations can still take place if knowledge obtainable by these means leaves a residual of uncertainty. Especially, there might be differences in degrees of private uncertainty between projects simply because of the institutional character of the industries. Thus, a given expenditure can reduce private uncertainty for one project more than for another, favoring the former's execution. Yet, it is possible that social uncertainty and profitability favor the second project. A temporary tariff can be used to correct the differences between private and social rates of return.

A. O. Hirschman stresses another cause of the divergence between private and social rates of return on investment. In his view investment projects differ with respect to the extent to which they induce latent entrepreneurial forces by creating markets for inputs or producing outputs

[1] Chenery, *op. cit.*, p. 85.

which are readily usable in further production processes[1]. Thus, an industry such as oil-refining, may attract investment because it is privately more profitable than the manufacture of shoes. Yet the shoe industry is more likely to mobilize entrepreneurs to supply leather, laces, glue, etc. used as input by the shoe factory while there are very few inputs of this nature into oil-refining.

If private and social rates of return, the latter including the incentive effects on entrepreneurs, can thus diverge, efficient allocation of resources requires elimination of the divergence. Tariffs on the output of the relevant industry would achieve this objective. The protection can be removed as soon as the entrepreneurial forces have come into existence.

## 2. The Dual Economy Argument

A rather widely employed concept in the literature on economic development is that of the dual economy. According to this concept the wages paid in the two sectors of the economy, agriculture and industry, do not reflect properly the social alternative costs of labor. More specifically, it is argued that the wage rate which an entrepreneur has to pay in the industrial sector exceeds the marginal social product of that labor in agriculture[2].

E. E. Hagen has shown that such a divergence between the private and social price of a factor of production leads to the misallocation of resources in the form of a socially less than optimum use of labor in industry[3].

This conclusion has led Hagen to suggest the use of a protective tariff on industry, which would raise the private rate of return in this sector of the economy above that in agriculture sufficiently so that the socially optimum quantity of labor gets hired by industry. Institutional changes accompanying economic development would eventually eliminate the basic cause of the existing divergence between private and social opportunity cost of labor at which time the protective tariff can be removed.

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[1] Hirschman employed (*op. cit.*) the concept of forward and backward linkage to describe these characteristics.

[2] See W. Arthur Lewis, "Economic Development with Unlimited Supplies of Labour", *The Manchester School of Economic and Social Studies*, Vol. XXII, 1954, pp. 139sqq. — Albert O. Hirschman, "Investment Policies and 'Dualism' in Underdeveloped Countries", *The American Economic Review*, Vol. XLVII, Menasha, Wisc., 1957, pp. 550sqq. — Harvey Leibenstein, "Technical Progress, the Production Function and Dualism", Banca Nazionale del Lavaro, *Quarterly Review*, Vol. XIII, Roma, 1960, pp. 345sqq.—Gustav Ranis and John C. H. Fei, "A Theory of Economic Development", *The American Economic Review*, Vol. LI, 1961, pp. 533sqq.

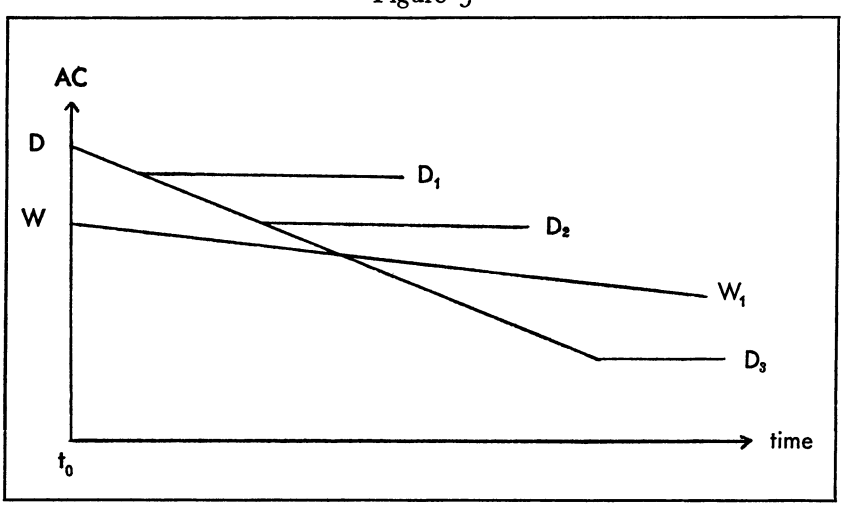
[3] See Hagen, *op. cit.*

### 3. Economies of Scale Argument

In the classical formulation of the infant industry argument in the narrow sense it was assumed that the fall in the domestic cost of production was independent of the scale of the industry and solely a function of time. A recent policy proposal by the Secretary-General of the United Nations Conference on Trade and Development was justified by "a logical extension of the infant industry argument"[1], which adds the notion that the fall in the domestic cost of production resultant from the learning of skills etc. is not only a function of time, but also depends on the size of the market.

The argument can be formalized with the help of Figure 5, an adaption of Figure 2. World price, $WW_1$, as a function of time is given. If domestic production is started by the imposition of a unit tariff DW, then through time costs of production will fall. But this process will continue only until price has reached $OD_1$, at which time the cost reducing forces will cease to work. The barriers to further reduction is the size of the domestic market. Only if the market is extended to include, say, all of the less developed countries, can the process of cost reduction be expected to continue. But the size of the resultant market may still not be large enough to reduce cost to world price, encountering a new barrier at $OD_2$. Only a market of the size typically available to the industry in the developed nations is sufficient to cause domestic costs to fall below world price ($OD_3$).

Figure 5




[1] *Towards a New Trade Policy, op. cit*, p. 80 and all of Part two, Chapter II.

The phenomenon just described is explained in the report as being due to the fact that "the relative smallness of national markets [and] ... high protective tariffs ... encouraged the establishment of small uneconomical plants, weakened the incentive to introduce modern techniques and slowed down the rise in productivity"[1]. At the same time, larger markets would enable the industries "to reap more easily the benefits of competition, specialization and economies of scale"[2].

It should be noted that according to the analysis of the classical argument economies of scale originating within the industry are not admissable as support for the need of tariff protection. Such economies lead to profits at maturity, which can be used by private entrepreneurs to pay off the loans incurred during infancy so that the industry does not require protection. The report does not elaborate on the nature of the "economies of scale" the industry is expected to reap but in the framework of the current analysis these economies have to be external and yet must be associated with certain scales of production only. This argument imparts a new dimension to the concept of external economies that has not been worked out in the economic literature. One would have to argue that for an industry to produce economically at a large scale, interrelations of a certain type among firms, workers and suppliers are necessary which cannot be learned at any other scale of the industry's output.

If one accepts the validity of the report's assertions, then the specific policy proposals for a system of temporary preferential tariff concessions of the following nature are justified: Freedom of trade in industrial products among all less developed nations with a retention of tariffs vis-a-vis the industrial countries. At the same time industrial countries are expected to put preferentially low tariffs on imports from developing countries. The resultant large markets would allow the infant industries to accumulate the skills necessary to lower cost to the level competitive with industry in the developed nations. At this point the system of preferential tariffs can be and should be abandoned, either by the removal of the remaining barriers between the industrial countries or by the reinstitution of tariffs vis-a-vis the developing countries.

The analysis of the cost and benefits of infant industry tariff protection presented for the classical case also applies to the modern versions of the argument. It is insufficient to establish that external effects in a dynamic context do exist. The costs accompanying their elimination must be smaller than the sum of future benefits, all properly discounted.

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[1] *Towards a New Trade Policy, op. cit.*, p. 25.

[2] *Ibid.*, p. 29.

## IV. Evaluation of the Arguments

My critical analysis of the arguments for infant industry protection falls into two broad categories, first the lack of information for empirical identification of industries and second the availability of more efficient alternative policies to achieve the same objectives as the tariff is designed to attain.

### 1. Lack of Empirical Evaluation

None of the arguments for infant industry protection supply the decision maker with any operational instructions on how to identify industries which actually deserve the protection; all that these arguments do is establish *a general* case for protection. This lack of specifics is readily explained if one considers the elusive nature of external effects, estimates of private and social risk, the interdependence of investment projects and the divergences between private and social cost of labor.

The broad version of the classical argument differs from the rest in that it justifies tariffs by criteria which involve essentially value judgments, such as the cultural characteristics of urban versus rural populations, or simply faith, namely, that having any kind of industry eventually reduces cost of production in that industry and others to be established later. One cannot argue that the first kind of justification is invalid, one can only hope that the decision to have a tariff is based on full information about the cost at which the allegedly valuable social characteristics are obtained. Faith in future events is similarly hard to argue with, though it might help to point out that the costs of industry-wide protection are likely to be high. Any indiscriminately applied tariffs will induce the creation of certain industrial branches which will fail as soon as the tariff is removed, simply because the country's comparative advantage does not lie in these fields. The vested interests created by the allegedly temporary protection will strongly oppose any subsequent removal of tariffs, often persuasively and on the intellectually respectable argument that the industries require "adolescent" protection. Chances are that the country ends up with a permanent protection of many high-cost, inefficient industries[1].

With the tools of economic analysis presently available it appears to be impossible to identify industries qualifying for infant protection both

[1] The observation of such behavior made A. Marshall remark: "I found that, however simple the plan on which a Protective policy started, it was drawn irresistibly to become intricate; and to lend its chief aid to those industries which were already strong enough to do without it. In becoming intricate it became corrupt ... On the whole I thought that this moral harm far outweighed any small net benefit ..." Alfred Marshall, *Money, Credit and Commerce*, Reprints of Economic Classics, New York, 1960, pp. 219sq.

ex ante and ex post. F. Taussig's detailed study of American sugar, iron and steel and textile industries, which were protected during their infancy in the early nineteenth century, ran into two serious obstacles[1]. First, tariffs once imposed never seem to get removed, thus making it impossible to observe whether protection has been sucessful or not. Second, the overall development of the United States during that period was such that these industries would probably have grown quite rapidly even without the tariff protection, making it practically impossible to identify the contribution to their growth made by the tariff itself. All of the industries examined by Taussig had begun to grow rapidly a few years before the Blockade resulting from the Napoleonic Wars had provided conditions in the United States that were equivalent to a prohibitive tariff.

The *modern* arguments for infant-industry protection also require a quantity and type of information which is very difficult to obtain in the real world, even if the nature of all the desired data were unambiguous and if practical formula for their use were available. Even the assembly of input-output or linear programming models with "reasonable" coefficients and the computer simulation of an economy are a long distance from coming up with scientifically valid *and* empirically relevant prescriptions about specific investment projects.

## 2. More Efficient Alternatives

The most serious criticism that can be made against the classical and all of the modern versions of the infant-industry argument for protection is that all of the objectives of the tariff can in each case be achieved by the use of more efficient alternative policies. In the following discussion of this point let me assume that the policy-making authorities have somehow succeeded in identifying specific industries subject to the types of effects discussed in the theoretical part of this paper.

The ultimate objective of the tariff is to raise the private rate of return in the relevant industry. Regardless of why the private rate is considered to be too low, it can be raised more efficiently by the use of a direct subsidy rather than the tariff. There are three main reasons for the superiority of the subsidy over the tariff. The first is that a subsidy avoids the loss of consumer surplus associated with the tariff, thus making the initial social cost of having the industry smaller. Second, the payment of a subsidy is a constant reminder to society that nursing of the infant is costing it resources, leading to more frequent and incisive reviews of the social value of the project. Third, dynamic changes in the rest of the world influencing the world price have direct impact on the size of the

[1] See Taussig, *op. cit.*

subsidy and are therefore more likely to be considered in review of the project.

One objection to the use of the subsidy is that in developing countries the fiscal system is incapable of raising sufficient revenue to pay for general government services, no less for paying subsidies to industries. In fact, governments in these economies rely heavily on revenue tariffs as a source of income for general government expenditures[1]. The use of a subsidy would therefore conflict with existing arrangements on two grounds: first, they would cost money directly and second, they would mean foregoing an important source of revenue. This position is logically unsound because when a tariff is designed to be protective it cannot simultaneously yield significant revenue. Imports must enter the country if a revenue is to be raised.

Thus, if a tariff protects an industry it cannot serve as a revenue tariff and the substitution of the subsidy does not mean foregoing this source of government income. Therefore, only the direct cost aspect of the subsidy remains as a valid objection. However, there exists an institutional arrangement which is capable of dealing with this problem: Set the tariff at such a level that imports can enter the country and use the revenue collected to pay a subsidy to the domestic industry.

This system terminates itself if the protected industry is a true infant in the sense developed above. The competition among the firms in the industry continuously lowers the domestic price, increasing the domestically produced share of total consumption until in the end imports cease altogether.

If the protected industry does not qualify as a genuine infant, these developments will not take place and dismantling of the scheme is no more difficult than one of prohibitive tariffs. But even if the scheme never gets removed, at least the imported share of domestic consumption was obtained at the low foreign cost[2] and the effects of foreign competition on quality, etc., can be expected to take place.

The argument about the superiority of subsidies over tariffs applies specifically to the classical argument, its extension into external scale economies by the United Nations Conference, to the Hirschman type of dynamic implications of certain investment projects, the Hagen dual economy and the Chenery interdependence of investments arguments.

[1] Stephen R. Lewis, Jr., "Government Revenue from Foreign Trade: An International Comparison", *The Manchester School of Economic and Social Studies*, Vol. XXXI, 1963, pp. 39sqq.

[2] If the domestic industry is truly monopolistic, it will allow sufficient imports such as to maximize the subsidy accruing to it. The income distribution resulting in this case, is an undesirable aspect of the scheme, but the subsidy feature makes it more noticeable than it would be under different arrangements.

The last two versions of the infant industry are subject to some added criticism. The Chenery-proposition depends on the government's access to information superior to that available to private entrepreneurs. The mere development of theoretically possible cases for such conditions is insufficient reason to advocate direct government protection of specific industries. It is by no means obvious that the government is capable of obtaining this information more readily than private entrepreneurs. The market appears to have its own ways of transmitting relevant information in some way, as the development and history of economic growth of Western market economies shows.

But even if with today's data-gathering and using technology the government has an edge over private entrepreneurs in discovering the relevant information, it does not follow that the best use of this knowledge is the impositions of a protective tariff. Optimal behavior might well be the free dissemination of this knowledge in the market, where entrepreneurs can pick it up and combine it with their own specialized knowledge in deciding how to invest their resources.

The Hagen argument for protection is based on the concept of the dual economy, which recently has come under scrutiny and subjected to some empirical investigation[1]. This is not the place to enter this discussion, for even if the basic assumptions of the dual-economy argument are valid, tariff protection does not appear to be the optimum solution to the problem. Tariffs attack only a symptom and are inferior to direct measures designed to deal with the basic causes more directly, without involving new distortions and social costs through the foreign-trade sector.

## V. Conclusion

Infant-industry arguments for protection derive their intellectual respectability by justifying market interference on the grounds that it improves the allocative efficiency of the free market economy. The theoretical analysis of this paper has shown that the market may in fact under certain, very restrictive conditions misallocate resources and that tariff protection could be used to prevent these misallocations. As the recent profusion of such arguments shows, logical possibilities of market failures based on mostly deductively arrived at premises are not very difficult to find, especially when much intellectual effort goes into the development of a literature on economic growth.

One of the shortcomings of these arguments is that they do not provide practical methods of measuring the costs of the failure to protect a certain industry versus the alternative of letting the market decide on its own

[1] See Schultz, *op. cit.*

whether and when a country should have the industry. The second, most serious deficiency of the infant-industry arguments for tariff protection lies in the availability of more efficient alternative policies. In the paper the superiority of subsidies over tariffs was discussed. One of the problems associated with subsidy payments, the inability of governments of developing nations to raise sufficient revenue, was analyzed and a solution in the form of a hybrid tariff-subsidy scheme was proposed.

In closing it should be pointed out that developing countries do not need to justify tariff protection by referring to infant-industry arguments and by entering into cost-benefit calculations which the rational approach to the problems suggests. If less developed countries want industry for its own sake and specific industrial branches for prestige or any other reasons, protection is sufficiently justified and the decision is unassailable on logical grounds[1]. The resultant inefficiencies and loss in welfare are the price at which these desired assets are bought. However, the public in these countries has the right to know that these costs are being incurred for the sake of industrialization.

* * *

Zusammenfassung: Die Grundzüge der klassischen und modernen Erziehungszollargumentation. — Von allen Beweisgründen, die gewöhnlich zur Verteidigung eines nationalen Schutzzolls vorgebracht werden, kann im Interesse einer wirksameren Allokation der Ressourcen in der ganzen Welt nur das Erziehungszollargument angeführt werden. Als solchem kommt ihm große rationale Überzeugungskraft zu. Die moderne Literatur über wirtschaftliche Entwicklung hat kürzlich einige Ausweitungen der alten klassischen Beweisführung hervorgebracht, wodurch ihre Anwendbarkeit erweitert und ihr neues intellektuelles Ansehen verliehen wurden. Eine sorgfältige Analyse dieser Argumente zeigt jedoch einen bemerkenswerten Mangel an Klarheit über den eigentlichen Inhalt der Argumentation und über die Voraussetzungen, unter denen sie gültig ist.

In der vorliegenden Abhandlung wird der wissenschaftliche Inhalt der klassischen und modernen Argumente für den Erziehungszoll mit Hilfe der modernen Instrumente der ökonomischen Theorie dargestellt. Es wird gezeigt, daß das klassische Modell nur für Prozesse anwendbar ist, bei denen die Erwerbung von Kenntnissen einer besonderen Art eine Rolle spielt. Das Argument von Bastable über die Notwendigkeit einer Untersuchung der Kosten und Vorteile wird wiedergegeben, und die Komponenten der Kosten und Vorteile werden im einzelnen dargelegt. Die modernen Argumente stellen sich als eine Erweiterung des klassischen Modells auf eine Welt der Unsicherheit, mit interdependenten Investitionsentscheidungen, einer dualistischen Wirtschaft und externen Ersparnissen bei Massenproduktion dar.

Zwei hauptsächliche kritische Einwendungen werden gegen diese Argumente erhoben: 1. Sie stellen nur logische Möglichkeiten von Marktfehlschlägen dar und

[1] See Harry G. Johnson, "An Economic Theory of Protectionism, Tariff Bargaining, and the Formation of Customs Unions", *The Journal of Political Economy*, Vol. LXXIII, 1965, pp. 256sqq., for an analysis and the behavioral implications of such a position.

liefern keine Werkzeuge für die Messung von Vorteilen und Kosten, die mit der Einführung von Zöllen verbunden sind. 2. In jedem Fall, in dem angenommen wird, der Zoll könne eine Fehlverteilung auf dem Markt heilen, könnten bessere und weniger kostspielige, alternative wirtschaftspolitische Instrumente, wie Subventionen oder Subventionen und Zölle, zur Erreichung der gleichen Ziele eingesetzt werden.

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Résumé: Analyse des arguments classiques et modernes pour la protection douanière d'industries naissantes. — De tous les arguments normalement avancés en faveur d'un tarif protecteur national ce n'est que l'argument de l'industrie naissante dont on puisse dire qu'il parle vraiment dans l'intérêt d'une allocation plus rationnelle des ressources du monde entier. Par conséquent, l'argument possède une grande force de persuasion. La littérature moderne sur le développement économique vient de produire quelques additions à l'argument classique, arguments qui ont étendu son applicabilité, tout en lui donnant une nouvelle respectabilité intellectuelle. Toutefois, l'analyse soigneuse de ces arguments révèle un manque remarquable de clarté en ce qui concerne et le sens de l'argument même et les conditions de sa validité.

Dans cet article, le contenu scientifique des arguments classiques et modernes en cette matière est présenté à l'aide des instruments modernes d'analyse économique. Il est démontré que le modèle classique n'est applicable qu'à des processus où il s'agit d'un genre spécial d'éducation. L'argument Bastable de la necessité d'une analyse des coûts et bénéfices est expliqué, et les composants des coûts et des bénéfices sont spécifiés. Les arguments modernes comprennent l'extension du modèle classique sur un monde d'incertitude, décisions d'investissement interdépendantes, économie dualiste, et économies extérieures.

Deux critiques principales sont opposées à ces arguments: 1. Ils ne présentent que des possibilités logiques d'insuccès de marché sans fournir des instruments pour mesurer les bénéfices et les coûts associés à l'imposition de tarifs. 2. Dans chaque cas où le tarif devrait remédier à une fausse allocation au marché, d'autres instruments de politique économique, instruments supérieurs et moins coûteux, tels que les subventions ou subventions plus tarifs, pourraient être employés pour arriver aux mêmes résultats.

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Resumen: Rasgos fundamentales de la argumentación clásica y moderna en pro de la industria incipiente. — De todos los argumentos que corrientemente se alegan en pro de la aduana nacional de protección, solamente se puede aducir el argumento de la industria incipiente en interés de una más eficaz alocación de los recursos de todo el mundo. Como tal argumento, posee una gran fuerza de persuasión racional. La moderna literatura sobre desarrollo económico ha traído recientemente algunas ampliaciones de la antigua argumentación clásica, con que se ha extendido su aplicabilidad, obteniendo con ello nuevo prestigio intelectual. Un análisis cuidadoso de estos argumentos muestra sin embargo una notable falta de claridad sobre el contenido propio de la argumentación y sobre las suposiciones bajo las cuales es válida.

En el presente artículo se expone el contenido científico de los argumentos clásicos y modernos en pro de la aduana de protección a base de los modernos instrumentos de la teoría económica. Se muestra que el modelo clásico sólo es aplicable a procesos en que interviene la adquisición de conocimientos de género especial. El argumento de

Bastable sobre la necesidad de una investigación de los costos y ventajas, es aquí reproducido, siendo expuestos en particular los componentes de los costos y ventajas. Los argumentos modernos aparecen como una ampliación del modelo clásico en un mundo de inseguridad, con decisiones de inversión interdependientes, dentro de una economía dualista y ahorros externos con producción en masa.

Dos objeciones críticas se ponen principalmente contra estos argumentos: a) que sólo representan posibilidades lógicas de fracasos del mercado, no dando instrumentos para medir ventajas y costos que van unidos a la introducción de aduanas; b) que en todo caso, afirmando que la aduana puede subsanar una mala distribución en el mercado, podrían ponerse en práctica igualmente instrumentos político-económicos menos costosos, tales como subvenciones o subvenciones y aduanas, para conseguir los mismos fines.